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10/666,723	09/17/2003	Chaohuang Zeng	ATHEP122	6055

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EXAMINER	
EJAZ, NAHEED	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/666,723	ZENG ET AL.	
	Examiner	Art Unit	
	NAHEED EJAZ	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 & 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 12/21/2007 have been fully considered but they are not persuasive because of the following:

2. With respect to claim 1, Applicant argues that multiple levels of correlation or an array of correlator elements as taught by Marshall is different from cross correlating the subsequences of samples with a known form of the subsequence to produce one cross correlation for each of the plurality of subsequences of samples (Remarks, page 5, paragraph 3, lines 5-8). This is not persuasive since Marshall (US 5,598,429) teaches that the input samples to correlation system 307 (figure 5) are correlated with known codes (see Abstract, lines 1-6, figure 12, elements 'input samples' & 'code sequence bits'). Furthermore, correlation system 307 (figure 5) is outputting one correlation result which reads on newly added limitations to the claim 1 'to produce one correlation for each of the plurality of subsequences of samples'. Applicant points out that the newly added limitations to the claim 1 are supported by Specification (page 9, lines 7-11 with respect to figure 4), it is noted that the mention lines of Specification 'to compute the cross correlation as the samples are shifted over time as new samples are input' (Specification, page 9, lines 9-10) suggest that multiple cross correlations are produced since cross correlation is computed whenever sample is shifted as new samples are input and Marshall (US 5, 598, 429) in figure 8 shows that the input samples are cross correlation with known sequence or codes by correlator element 1 one result is produced by correlator 1 or 2 which is equivalent to claim limitations.

Response to Amendment

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 12 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (5, 598,429) in view of Muratani et al. (7,123,744) and further in view of Yasotharan et al. (2004/0120409) (hereinafter, Muratani and Yasotharan respectively).

5. As per claim 1, Marshall discloses, 'sampling a received signal to produce a sequence of samples wherein the sequence of samples includes a plurality of subsequences of samples' (figure 5, elements 303 & 304, col.2, lines 57-64), 'cross correlating the subsequences of samples with a known form of the subsequence to produce one cross correlation for each of the plurality of subsequences of samples' (see Abstract, lines 1-6, figure 5, element 307 & figure 8, col.3, lines 4-40). Marshall also processes the digital correlated values (figure 15) but he fails to disclose self correlation the cross correlation.

Muratani auto correlating (claimed 'self correlation') the cross correlation (figure 3, elements 31 & 34, col.7, lines 5-10) and produce plurality of self correlations (figure 9, elements 38, col.11, lines 30-43) (it is noted that in figure 9 Muratani discloses circuits 91 to 9N each includes auto correlation units which generates plurality of outputs which are combined (figure 9, element 18 & figure 10, col. 11, lines 28-34 & 39-43)(claimed

'summing the self correlations') and output as a whole as the detecting result 38 (figure 10, col.11, lines 39-43) and thus reads on claim limitations of 'self correlating the cross correlations to produce a plurality of self correlations' and 'summing the self correlations').

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Muratani into Marshall in order to determine the peak position and period of the number sequence by auto correlating (self correlating) the cross correlation in order to detect the target value as taught by Muratani (col.4, lines 3-14).

Marshall and Muratani do not teach detection of packet.

Yasotharan detects the pulse train by using test static calculator that is based on the output values of self correlators (figure 7, element 404, 414, 416 & 418). Yasotharan teaches two methods for the calculator 418 in order to detect the pulse train first, maximum likelihood test statistic and second, correlation test statistic (page # 4, paragraph # 0053, page # 5, paragraph # 0056, lines 7-21, paragraph # 0057) which reads on claim limitations of 'detecting a packet at least in part by processing the sum of the self correlations'.

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Yasotharan into Marshall and Muratani in order to achieve symbol synchronization in an OFDM communications system by detecting the training pulse through pulse train detector and generates and alarm if error exceeds

a predetermined value taught by Yasotharan (page # 1, paragraph # 0001 & page # 5, paragraphs # 0053-0054 & 0066).

6. As per claim 12, Marshall discloses, 'resetting upon the occurrence of an automatic gain control adjustment' (figure 13, element 701, 'average digital AGC', col.8, lines 30-61).

7. Claim 20 is rejected under the same rationale as mentioned in the rejection of claim 1 above. Furthermore, it is noted that Marshall discloses 'an ADC configured to sample a received signal' (figure 6, elements 301 & 302).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (5, 598,429) in views of Muratani et al. (7,123,744) and Yasotharan et al. (2004/0120409), as applied to claim 1 above, and further in view of Bohnke et al. (2006/0269008) (hereinafter, Bohnke).

9. As per claim 9, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 9 depends but they fail to disclose adjustment of the sign of self correlations according to a known sequence.

Bohnke teaches, 'summing the self correlations includes adjusting the sign of the self correlations according to a known sequence' (figures 2 & 6, page # 1, paragraphs # 0009-0012, page # 3, paragraph # 0044, page # 4, paragraph # 0046) (it is noted in the figure 6 cross correlated values 16 are being multiplied by complex conjugated samples (claimed 'self cross correlation') (in the light of Specification, page # 9, lines 10-11) of an expected repetition pattern (claimed 'known sequence') before they are summed by SUM (figure 6) (claimed 'summing the self correlation'). Furthermore, Bohnke discloses

that in figure 6, cross correlation peak of the repetition pattern are also detected by '+' & '-' values of phase (page # 3 - 4, paragraph # 0044) which reads on claim limitations of 'adjusting the signal').

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to implement the teachings of Bohnke into Marshall, Muratani and Yasotharan in order to provide the phase information thus information on the position of the correlation peak in the reference symbol and thus a more accurate and reliable synchronization information as taught by Bohnke (page # 4, paragraph # 0045).

10. As per claim 10, in addition to aforementioned rejection of claim 9 above, Marshall, Yasotharan and Bohnke teach all the limitations in the previous claims on which claim 10 depends but they fail to disclose pseudorandom sequence.

Muratani teaches auto correlations (claimed 'self correlation') according to a pseudo-random sequence (figure 3, elements 32, 31 & 35) (claimed 'self correlations according to a pseudorandom sequence').

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Muratani into Marshall, Yasotharan and Bohnke in order to determine the peak position and period of the number sequence by using the pseudorandom sequence for auto correlating (self correlating) the cross correlation in order to detect the target value as taught by Muratani (col.4, lines 3-14 & 63-67, col.5, lines 1-7).

11. Claims 2-6, 8, 11, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (5, 598,429) in views of Muratani et al. (7,123,744) and Yasotharan et al.

(2004/0120409), as applied to claim 1 above, and further in view of Husted et al. (2002/0183027) (hereinafter, Husted).

12. As per claim 2, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 2 depends but they fail to disclose comparing of magnitude of the sum of the self correlations to a threshold.

Husted teaches, 'processing the sum of the self correlations includes comparing the magnitude of the sum of the self correlations to a threshold' (page # 5, paragraphs # 0060-0065).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Husted into Marshall, Muratani and Yasotharan in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

13. As per claims 3, 4 & 5, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which these claims depend but they fail to disclose first and second threshold and comparison of the summed magnitude of the self correlation.

Husted discloses two threshold windowing process on a self correlation measurement (page # 5, paragraph # 0065) (claimed first and second thresholds) and he summed the magnitude of the real and imaginary parts of the self correlation (page #

5, equation # 7) (claimed 'magnitude of the real part of the sum of the self correlations and the magnitude of the imaginary part of the sum of the self correlations') before comparing them with the first and second threshold (page # 5, paragraphs # 0061-0065) (claimed comparison of the magnitude of summed sums and summed magnitudes to a second threshold).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Husted into Marshall, Muratani and Yasotharan in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

14. As per claim 6, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 6 depends but they fail to disclose first threshold and second threshold comparison for the summed magnitudes of the self correlations.

Husted discloses, 'processing the sum of the self correlations includes comparing for a period of time the magnitude of the sum of the self correlations to a first threshold and summing magnitudes of the sum of the self correlation that exceed the first threshold and comparing the summed magnitudes to a second threshold' (page # 5, paragraphs # 0061-0063 & 0065).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Husted into Marshall, Muratani and Yasotharan

in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

15. As per claim 8, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 8 depends but they fail to disclose determination of packet boundary based on the time and the sum of the self correlation is maximum.

Husted teaches, 'processing the sum of the self correlations includes determining a packet boundary based on the time when the sum of the self correlations is determined to be a maximum' (page # 5, paragraphs # 0061, 0063 & 0064).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Husted into Marshall, Muratani and Yasotharan in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

16. As per claim 11, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 11 depends but they fail to disclose resetting the sum to zero.

Husted teaches, 'resetting the sum of the self correlations to zero upon the

occurrence of an automatic gain control adjustment' (figure 3, page # 4, paragraph # 0043-0048) (it is noted in the mentioned paragraphs that if the acc_count counter is zero, accumulator adcpwr1 is being reset and it happens during AGC operation (page # 4, paragraph # 0043-0045) (claimed 'occurrence of an automatic gain control'), furthermore, AGC 230 takes the power measurement from power detector 220, which is connected to self correlation 225, (figure 3, page # 2, paragraph # 0024) and these measurements involves maximum output zero based on the log table calculation (page # 3, paragraph # 0035) which reads on claim limitations of 'resetting the sum of the self correlations to zero' since both power detector 220 and self-correlator 225 are connected together in order to output the signal to the AGC control 230 (figure 3).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Husted into Marshall, Muratani and Yasotharan in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

17. As per claim 14, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claim 14 depends but they fail to disclose reducing the number of bits.

Husted teaches, 'rescaling the received signal to reduce the number of bits required for cross correlation and self correlation' (page # 2, paragraph # 0022, lines 6-13).

It would have been obvious to one of ordinary skill in the art, at the time of invention was made, to implement the teachings of Husted into Marshall, Muratani and Yasotharan in order to differentiate desired in-band signals from high power out-of-band signals that overlap into the target band by verifying the in-band signals by a multi-threshold comparison of the normalized self-correlation to verify the presence of a new, desired in-band signal as taught by Husted (see Abstract) thus provide an automatic gain control system for a receiver.

18. Claims 7 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marshall (5, 598,429) in views of Muratani et al. (7,123,744) and Yasotharan et al. (2004/0120409), as applied to claim 1 above, and further in view of Kim (7,012,881).

19. As per claims 7 & 13, Marshall, Muratani and Yasotharan teach all the limitations in the previous claim on which claims 7 & 13 depend but they fail to disclose determination of frequency offset.

Kim discloses, 'processing the sum of the self correlations includes determining a frequency offset from the phase of the sum of the self correlations' (figures 2 & 3, col.8, lines 40-67), 'including determining a frequency offset from the angle of the sum of the self correlations' (figures 2 & 3, col.8, lines 40-67).

It would have been obvious to one of the ordinary skill in the art, at the time of invention was made, to implement the teachings of Kim into Marshall, Muratani and

Yasotharan in order to estimate frequency offset for OFDM and achieve frequency synchronization as taught by Kim (col.3, liens 39-54) thus enhance system performance.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Naheed Ejaz
Examiner
Art Unit 2611

3/5/2008

N.E.

/Chieh M. Fan/

Supervisory Patent Examiner, Art Unit 2611